# Goddard Procedural Requirements (GPR)

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| **DIRECTIVE NO.** | GPR 7900.0 | **APPROVED BY Signature:** | *Original Signed by* |
| **EFFECTIVE DATE:** | April 5, 2016 | **NAME:** | William A. Wrobel |
| **EXPIRATION DATE:** | April 5, 2021 | **TITLE:** | Director, Wallops Flight Facility |

**COMPLIANCE IS MANDATORY**

**Responsible Office:** 830/Aircraft Office

**Title:** Aviation Safety Program

## PREFACE

### P.1 PURPOSE

This procedure describes the Goddard Space Flight Center (GSFC) Aviation Safety Program and its implementation.

### P.2 APPLICABILITY

This procedure applies to GSFC personnel and support service contractors, to the extent specified or referenced in the appropriate contract, grant, or agreement, that are involved with aviation activities, equipment, facilities, or airspace to include contract manned and unmanned aircraft supported by GSFC.

### P.3 AUTHORITIES

a. NPD 7900.4, NASA Aircraft Operations Management
b. NPR 7900.3, Aircraft Operations Management Manual

### P.4 APPLICABLE DOCUMENTS AND FORMS

a. NPR 1800.1, NASA Occupational Health Program Procedures
b. NPR 3451.1, NASA Awards and Recognition Program
c. NPR 8621.1, NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping
d. NPR 8715.3, NASA General Safety Program Requirements
e. GPR 7120.4, Risk Management
f. GPR 7900.1, Airworthiness and Flight Safety Review Process for Manned Aircraft and Unmanned Aerial Systems
g. GPR 8621.4, GSFC Mishap Preparedness and Contingency Plan
h. GPR 7900.1, Airworthiness and Flight Safety Review Process for Manned Aircraft and Unmanned Aerial Systems
i. 830-FOM-0001, GSFC Flight Operations Manual
j. 830-MAMC-0001, Aircraft Office Mission Anomaly and Mishap Contingency Plan
k. 830-SEC-0001, Aircraft Security Plan

l. 830-AOF-0101, NASA GSFC WFF Flight Medical Clearance (form)
m. FAA Advisory Circular 001.1A, Public Aircraft Operations

## P.5 CANCELLATION

GPR 8715.2, Aviation Safety Program

## P.6 SAFETY

It is GSFC policy to fully support a vigorous and proactive Aviation Safety Program to protect the safety and health of the general public, the workforce, and our high-value assets, both on and off the ground. Mission success in aviation relies on an aggressive safety program.

## P.7 TRAINING

Safety training shall be a part of indoctrination for all new aviation and project personnel. See Section 2.1

## P.8 RECORDS

| Record Title | Record Custodian | Retention |
|---|---|---|
| Safety Surveys | Aviation Safety Officer | *NRRS 1/120E. Retire to FRC when the Risk/Safety Assessment/Analysis is complete/inactive. Destroy when 15 years old. |
| Mission Operational Risk Assessment Panel (MORAP) Memorandum, Operational Risk Assessment, Recommendations and Mitigations | Mission Project Manager | *NRRS 1/120E. |
| Quarterly Aviation Safety Presentation, Attendance Sheet, Actions Generated | Aviation Safety Officer | NRRS 7/26A Destroy when 2 years old. |
| Airfield Oversight Awareness Memo | Aviation Safety Officer | NRRS 7/26B Destroy when 6 years old or when superseded whichever is later. |
| Pilot Irregularity Report | Aviation Safety Officer | NRRS 7/26B |
| Airfield Irregularity Report | Aviation Safety Officer | NRRS 7/26B |
| Aviation Safety Binder | Aviation Safety Officer | NRRS 7/26B |

**NRRS – NASA Records Retention Schedules (NRRS 1441.1)*

## P.9 MEASUREMENT/VERIFICATION

Internal and external auditors responsible for verifying HQ requirements and processes evaluate the performance against the requirements contained within this GPR and NPR 7900.3.

To determine Center compliance with this GPR and NPR 7900.3, the Center Director or designees determine and document compliance by applying a verification process that is tailored to meet GSFC's needs. The HQ Aircraft Division, with the support of the Inter-Center Aircraft Operations Panel (IAOP), conducts biennial reviews and spot checks to review the Aviation Safety Program's documentation and implementation of specific aircraft operations and commercial aircraft services activity.

## PROCEDURES

In this document, a requirement is identified by "shall," a good practice by "should," permission by "may" or "can," expectation by "will," and descriptive material by "is."

Supervisory responsibility for the Aviation Safety Program is delegated from the Center Director to the Suborbital and Special Orbital Projects Directorate (SSOPD), Code 800, ensuring that program responsibilities and elements are effectively implemented. Management of the Aviation Safety Program is assigned from the Center Director to the Aircraft Office, Code 830, Aviation Safety Officer (ASO) who carries out program elements and controls the Aviation Safety Program Binder.

Contracts involving or affecting aviation operations shall stipulate compliance with NASA aviation safety requirements. Offices with requirements involving or affecting aviation operations shall ensure that NASA aviation safety requirements are included in the technical requirements documentation (e.g. Statement of Work) package provided to Procurement. Requiring offices should coordinate with the NASA ASO, as necessary, to ensure that the appropriate requirements are included in the technical requirements package.

Projects on NASA aircraft or Unmanned Aerial Systems (UAS) assigned to GSFC shall complete a review by the Airworthiness and Flight Safety Review Board (AFSRB) (reference GPR-7900.1) and the associated readiness reviews prior to flight. The airworthiness process is applicable to all NASA/GSFC controlled program aircraft or UAS that are bought, borrowed, chartered, rented, or otherwise procured or acquired. This includes aircraft/UAS which are acquired with the aid of NASA funding, regardless of cost, from any source for the purpose of conducting NASA science, research, or other missions and which are operated or whose operation is managed or facilitated by GSFC. In addition, this includes any other aircraft/UAS designated by the Director of Wallops Flight Facility (WFF).

All Non-NASA aircraft conducting program support flights with GSFC personnel, including GSFC contractors, onboard shall complete a GSFC Aircraft Office Non-NASA Aircraft Safety Review.

## 1.0 RESPONSIBILITIES AND AUTHORITIES

1.1 Center Director/Code 100 - Primary responsibility for the establishment and implementation of the Center's Aviation Safety Program, as set forth in NPR 7900.3, *Aircraft Operations Management Manual* and NPR 8715.3, *NASA General Safety Program Requirements*.

1.2 Director of Wallops Flight Facility (Suborbital and Special Orbital Projects Directorate (SSOPD)/Code 800) - Supervisory responsibilities for the GSFC Aviation Safety Program.

1.3 Assistant Director, Management Operations/Code 200 - Responsible for providing health and environmental support for the GSFC airport and aviation facilities, including mishap investigation support in accordance with this GPR and airfield documents referenced in Section P.4.

1.4 Chief, Aircraft Office (Chief of Flight Operations)/Code 830 - Responsible for ensuring effective management of flight operations under the Center's cognizance, per NPD 7900.4. The position maintains appropriate communication with Center personnel, Headquarters, other centers and outside groups with respect to aircraft operational matters. Responsibilities include:

a. Shall have the final operational flight release authority for any NASA aircraft/UAS operating from or under the cognizance of GSFC.
b. Authorizing personnel (per designation letter) to operate and maintain NASA aircraft under GSFC control.
c. Determining the number and types of aircraft/UAS for which an individual may maintain qualification at any given time and annually review that determination.
d. Recommending assignment of the GSFC Aviation Safety Officer, with the concurrence of the Director of Safety and Mission Assurance, to the Center Director for approval.
e. Administering flight operations and/or flying as an aircrew member or observer on all assigned aircraft, where practicable and as necessary, to observe performance of assigned aircrew.

f. Directly supervising and managing the activities of personnel assigned as Code 830 staff.
g. Establishing operational policies and standards, which are conducive to safe, efficient flight research and related support activities. Assuring compliance with policies, procedures, and practices described in governing documents.
h. Establishing process standards regarding airworthiness, configuration control, aircraft modifications, maintenance, ground support equipment, and associated aviation procedures.
i. Assigning pilots to research and research support missions based on individual competency, experience, and currency.
j. Ensuring currency, training and proficiency of flying personnel is appropriate for the aircraft and mission assigned.
k. Establishing individual initial training, checkout, and currency requirements.

1.5 Aviation Safety Officer (ASO)/Code 830 – The ASO shall be a civil servant assigned to the Aircraft Office. The ASO must be a qualified Pilot-in-Command (PIC) of at least one of the center's research aircraft. Responsibilities/duties include but are not limited to:

a. The ASO shall serve as the Center's focal point for aviation safety, and act on behalf of the Center Director when discharging this responsibility.
b. The ASO has the duty to advise the Chief, Aircraft Office (Chief of Flight Operations) regarding safety issues/concerns within the organization. Managers will use the advice of the ASO in formulating organizational decisions but must not expect or rely upon the ASO to make managerial decisions.
c. The ASO serves as a member of the Center's AFSRB and is responsible for managing the Center's Aviation Safety Program and ensuring that the goals of the program are clearly understood. If the ASO believes that a safety concern has not been dealt with, the ASO may take the concern directly to the Center Director. In addition, the ASO may take the concern to the Director of Safety and Mission Assurance or the Assistant Administrator for the Office of Strategic Infrastructure.
d. Promoting aviation safety and awareness through close liaison with GSFC managers, GSFC safety personnel, and GSFC aviation personnel.
e. Providing safety oversight and evaluation of aviation-related activities, including aviation-related activities at the Wallops Range and Wallops Airfield.
f. Participating in NASA and GSFC annual aviation safety surveys and inspections.
g. Representing GSFC at NASA aviation safety meetings.
h. Membership on the GSFC Safety Management Committee (SMC), the GSFC AFSRP and the GSFC Engineering Review Panel (ERP).
i. Participating in risk assessments and hazard analyses for all airport and aviation-related activities.
j. Participating in aviation-related airworthiness reviews, aircraft scheduling reviews, flight standardization reviews, non-NASA aircraft reviews, and Manned and unmanned readiness reviews.
k. Reviewing and approving project related plans and safety plans that involve aviation matters.
l. Monitoring and participating in investigations of aviation hazard reports and aviation mishap reports.

m. Maintaining an aircraft specific mishap investigation kit for compliance with ASO duties in the Aircraft Office Mission Anomaly and Mishap Contingency Plan (830-MAMC-0001).
n. Chair the Mission Operational Risk Assessment Panel (MORAP) to ensure capture of operational hazards and mitigations in a document accepted by the AFSRB and the Chief, Aircraft Office (Chief of Flight Operations).
o. Chair the Aviation Safety Committee semi-annual meeting which provides a forum for Aircraft Office members to address safety concerns which are then briefed to the Chief, Aircraft Office (Chief of Flight Operations).
p. Meet with WFF management quarterly to provide or explain any on-going or future Aviation Safety related concerns.
q. Assist/advise offices during requirements development of the appropriate/applicable aviation safety requirements for incorporation into the technical requirements documentation. This includes, but is not limited to, NASA aircraft operations safety oversight, source selection criteria, contract deliverables related to activities involving aviation activities, facilities, or equipment, and written declarations of public use status.

1.6 Aircraft Office Operations Manager (AOOM)/Code 830 – The Aircraft Office Operations Manager is responsible for the long term planning, development and implementation of project processes and mission life cycles and day-to-day management and scheduling of all aircraft/UAS operations at GSFC.

AOOM duties include, but are not limited to:
a. Planning, developing, directing and coordinating the activities necessary to conduct national and international missions aboard GSFC aircraft.
b. Coordinating aircraft operations for the sole carriage of passengers.
c. Ensuring that properly qualified aircrew are scheduled for all GSFC flight operations.
d. Prioritizing NASA and non-NASA GSFC aircraft operations to ensure flight hours are executed appropriately with cost traceability.

1.7 Training Manager (TM)/Code 830 – The Training Manager tracks and maintains data associated with the required training of all GSFC assigned aircrew. The TM schedules annual, periodic and specialized training evolutions and coordinates with external entities for the use of specialized training equipment, instructors and facilities. The TM is also responsible for developing the aviation life support equipment required matrix, as well as, ensuring that all aircrew are issued, and trained in the use of, positional appropriate survival gear.

1.8 Quality Assurance Manager/Ground Safety Officer (QAM/GSO)/Code 830 – In accordance with NPR 7900.3, the Quality Assurance Manager serves as the quality assurance specialist for all GSFC aircraft. As a technical authority, the QAM/GSO plans, develops, organizes, administers, evaluates, and coordinates a comprehensive aerospace quality assurance program for all quality assurance functional program areas and performs technical quality control inspections to evaluate all sub-areas of related

equipment, systems and procedures. The QAM/GSO also monitors for compliance with OSHA and NASA work standards.

1.9 Pilot-In-Command (PIC) - The PIC for any NASA program involving aviation assets has the final responsibility and authority to ensure the safe operation of the aircraft or flight vehicle in use.

1.10 Program/Project/Mission Management – Program, Project, and Mission Managers using aviation assets shall ensure that all activities are conducted in accordance with current aviation safety standards and procedures, including aviation safety requirements for aircraft and unmanned aerial systems (UASs) in accordance with NPR 7900.3.

1.11 Offices with requirements involving or affecting aviation operations

a. For safety oversight, shall coordinate with the GSFC Aircraft Office (Code 830) when developing requirements that involve Commercial Aircraft Services (CAS).
b. Shall structure CAS source selection criteria and contract technical requirements to authorize NASA oversight provisions for a CAS flight safety review both before and after contract award.
c. Shall provide written declaration of public use status when required by FAA Advisory Circular 00-1.1A, Public Aircraft Operations.

1.12 Contracting Officers shall:

a. Incorporate into contracts, grants, or other agreements, any NASA aviation safety requirements that are included as part of the technical requirements documentation package provided by the requirements initiator.
b. Enforce such aviation safety requirements during performance of the contract, grant, or agreement, to ensure contractor compliance.

m. Employee Responsibilities - All personnel, including contract employees, associated with GSFC programs and projects involving flight operations will conduct aviation-related activities in a safe and responsible manner and in compliance with established NASA procedural guidelines/requirements. Each employee should immediately report aviation-related hazards and take appropriate and timely corrective actions to mitigate the hazard.

## 2.0 PROGRAM ELEMENTS

### 2.1 Safety Training, Education, and Awareness

2.1.1 Aviation Safety Inspections, Surveys and Evaluations – A NASA Headquarters aviation safety review of each Center shall be conducted biennially by the Intercenter Aircraft Operations Panel (IAOP). This survey uses the IAOP review checklist and will include a review of tool control, foreign object damage control, wildlife hazard control, maintenance, airworthiness and flight operations.

The local flight operations office and/or the ASO shall conduct an internal survey during the alternate year. These surveys provide an objective evaluation of aircraft operations, maintenance, crew procedures, and facilities to ensure safe and efficient operation and aircraft usage consistent with assigned goals and Center requirements.

2.1.2 Aviation Safety Working Group- In accordance with NPR 7900.3, NASA and contractor employees in the GSFC Aircraft Office (Code 830) shall meet on a semi-annual basis to focus on specific aviation safety topics and/or overall safety awareness. Records are maintained and actions (if applicable) are tracked to closure. This meeting will be chaired by the ASO and the findings/recommendations from the group will be reported by the ASO to the Chief, Aircraft Office for GSFC. Membership is defined in NPR 7900.3

2.1.3 Aviation Safety Education and Training – Safety education for aviation safety officers shall include attendance at a recognized ASO's training course and participation in a continuing education program IAW NPR 7900.3 to ensure adequate knowledge to discharge the duties of the ASO's position. Aviation safety training records are retained in the Aviation Safety Binder

2.1.4 Aviation Medical Program and Aircraft Safety Briefs – The Aviation Medical Program and the Aircraft Safety Briefs are important elements to sustained aviation safety awareness. All primary aircrew shall comply with the NPR 7900.3 requirements for flight medical clearances.

All qualified non-crewmembers shall complete a NASA GSFC WFF Flight Medical Clearance Form (830-AOF-0101) that should be reviewed by a NASA flight surgeon If unable to be reviewed by a NASA flight surgeon, at a minimum, the PIC or the ASO shall review and accept (or reject) the medical form. These records are maintained by the associated project manager.

The PIC for each flight shall ensure that personnel safety briefings have been completed prior to flight. Safety briefings for all project flight crewmembers shall include medical requirements and the proper use of Aviation Life Support Equipment (ALSE).

2.1.5 Aviation Safety Program Binder – The ASO shall maintain a binder that contains documentation pertaining to the GSFC Aviation Safety Program elements. This binder will document the requirements of the NPR 7900.3 and this GPR for at least the last 24 months of GSFC Aircraft Office activity.

2.1.6 Quarterly Aviation Safety Training - The ASO shall coordinate or conduct safety training for operations and maintenance personnel.

Documented attendance shall be retained in the Aviation Safety Program Binder (retained by the ASO) and those absent will be provided the training materials by the ASO as soon as practicable.

2.1.7 Aviation Safety Publications – Safety publications are an excellent source of information to promote overall safety awareness. The ASO shall ensure that aviation publications are distributed to aviation personnel.

2.1.8 Aviation Safety Awards – The ASO should periodically use safety incentives and awards to motivate and maintain safe behavior. Recognition of individuals shall be considered and awarded in accordance with the NASA Awards and Recognition Program (NPR 3451.1).

2.1.9 Aviation Safety Bulletin Board – The Aviation Safety Bulletin Board shall contain information designed to encourage discussions related to pilot training, decision making, hazards to aviation, NASA operations or flight test safety concerns. This material should be reviewed monthly and replaced at least quarterly by the ASO or the Pilot Training Manager.

The Aviation Safety Bulletin Boards shall be maintained in a highly visible location where aviation activities are conducted.

2.1.10 Pilot Training – The ASO provides oversight of all GSFC pilot training and is responsible for the efforts of the Training Manager. The ASO maintains awareness of all GSFC pilot qualifications and works with the Operations Manager to ensure pilots are trained and qualified for maximum mission effectiveness. This process is accomplished by determining the annual civil servant and contracted pilot scheduling requirements as established by the AOOM which then dictates the pilot training goals for qualifications, annual proficiency check-rides for recurrent or initial pilot training. Ideally, the AOOM and the ASO and/or the Training Manager will establish these requirements several months (at a minimum) before a given flight operation is scheduled.

The Pilot Training Manager is then charged with building a schedule to account for the qualification needs and shall maintain a tracking system with all Flight Operations Manual (830-FOM-0001) and NPR 7900.3 required pilot training documentation.

2.1.10.1 Training Manager – The Training Manager reports directly to the ASO on all items related to pilot training, qualification, designation and mission scheduling proposals. His/her specific responsibilities include:

a) Projecting pilot training requirements based upon operational scheduling
b) Ensuring that Initial and Recurrent training for all GSFC pilots has been accounted for
c) Generating training Statements of Work (SOW's) as required by the Code 830 Business Manager
d) Monthly updates to the all pilots "Read and Initial" board
e) Monthly updates to Pilot Flight Hour Tracker
f) Weekly updates to Pilot Qualification Tracker Spreadsheet
g) Ensure pilot currency is tracked in NAMIS
h) Serve as the backup for all ASO board membership requirements when the ASO is deployed or on leave.

2.1.11 Airfield Oversight - The ASO provides oversight of all aircraft/UAS operations that occur at WFF. This oversight includes periodic reviews of the wildlife mitigation processes, the airfield Foreign Objects & Debris (FOD) prevention program, transient and routine military aircraft incidents, dispatcher and Unicom procedures, and pilot compliance with tower instruction. The ASO shall meet at least quarterly with the Airport Operations Manager and the lead WFF Air Traffic Control Tower Operator to document any unusual or unauthorized flight activities at WFF. This forum will also allow for open discussion related to aviation safety improvements that should be addressed at the airfield.

Should incidents be discussed that require elevation to WFF management for awareness or action, a memo shall be generated from the ASO to WFF management with concurrence from the Chief, Aircraft Office (Chief of Flight Operations). All memo's to management shall be retained in the Aviation Safety Program Binder.

Range operations that include aircraft participation shall require the ASO (or designated representative) at all Range Readiness Reviews and other reviews as appropriate.

2.1.11.1 Airfield Oversight Investigations – Should an incident occur at WFF that could potentially impact the safety of personnel associated with aircraft activities (i.e., runway incursions, near midair, violation of tower direction, improper tower instructions, etc.), the ASO shall be notified by airfield management who will then determine what level of intervention or investigation is required based upon the incident circumstances. The ASO is also required to ensure that WFF management is informed of the incident as soon practical and also ensure that reporting is done to the Center Director if applicable.

In accordance with NPR 7900.3 and GPR 8621.4, documentation requirements for any mishap or close call investigation will be determined on a case-by-case basis. The ASO shall coordinate his/her investigation efforts and documentation routing through the Wallops Safety Office.

2.1.11.2 Airfield Oversight Awareness – The ASO should meet at least once a month with WFF Tower personnel and airfield operations management to annotate and discuss airfield/aircraft related incidents. The ASO should meet with wildlife management at least once a quarter to evaluate bird and animal strike mitigation strategies. A quarterly meeting with WFF management which discusses all ongoing elements of aviation operations should be conducted quarterly. The topic covered by these discussions shall be retained as a memo to file by the ASO.

## 2.2 Hazard Reporting, Investigation, and Control

The primary means of initially reporting close calls and hazards related to Aviation Safety is through the NASA Mishap Information System (NMIS). The ASO is responsible for ensuring that the GSFC WFF Code 803/Safety Office is informed of any Code 830/Aircraft Office close calls, mishaps or safety related incidents and that those incident are reported to the appropriate level of NASA authorities.

All inflight hazards or incidents as stipulated in 830-FOM-0001 shall be reported via the Pilot Irregularity Report (PIR) by the Pilot in Command of the incident aircraft.

This PIR shall be reviewed by the ASO to determine if it needs to be reported in NMIS. The results of the ASO's determination will be recorded on the PIR.

These PIRs shall be reviewed annually by the ASO and the Chief, Flight Operations, assessed for hazard trends, and retained by the ASO.

All WFF airfield or aircraft incidents not involving Code 830 aircraft or Code 830 civil servant or contracted pilots shall be reported to the ASO via an Airfield Irregularity Report (AIR).

This AIR shall be reviewed by the ASO to determine if it needs to be reported in NMIS. The results of the ASO's determination will be recorded on the AIR.

These AIRs shall be briefed to WFF management, reviewed annually, assessed for hazard trends and retained by the ASO.

## 2.3 Mishaps and Near Midair Collision Reporting, Investigation, and Prevention

Mishap and near midair collision reporting, investigation, and prevention success requires the highest degree of management commitment and employee involvement. NPR 8621.1 and GPR 8621.4 provide policy and requirements for NASA mishap reporting and investigation. Aviation managers and the ASO shall be knowledgeable of current procedures, guidelines, and requirements. Timely and effective response to a mishap can save lives, reduce injury and damage to property, and preserve evidence that may be used to determine cause and prevent future mishaps.

The ASO's (or designated representative) responsibilities following a close call or mishap involving GSFC aircraft or personnel flying on or maintaining GSFC aircraft are as follows:

1) Ensure mishap response is initiated in accordance with the Aircraft Office Mission Anomaly and Mishap Contingency Plan (830-MAMC-0001)
2) Ensure Quality Assurance (QA) mishap response duties are performed.
3) Verify that NPR 8621.1 and GPR 8621.4 notification timelines are adhered to.
4) Provide input to and/or initiate NMIS entry.
5) Assist Incident Response Team (IRT) as required.
6) Participate on or assist Mishap Investigation Board (MIB) as required.

In the event of a mishap or close call involving GSFC aircraft, the GSFC Code 830/Quality Assurance Manager (QAM) shall perform the following duties:

1) Lock NAMIS to prevent any changes to the mishap aircraft status or maintenance history.
2) Impound any hard copy maintenance documentation related to the mishap aircraft including the daily release form, the maintenance turnaround form, weight and balance form, etc.

3) Impound the mishap aircraft logbooks
4) Secure all QA audit or Government Mandated Inspection Points (GMIPs) documentation directly or indirectly related to the maintenance of the mishap aircraft.
5) Secure all relevant engineering documentation associated with the current science configuration of the mishap aircraft.
6) Deliver all aforementioned documentation to the ASO or the ASO's designated representative as soon as it is available.
7) Provide any other mishap aircraft relevant information to the ASO or the ASO's designated representative.

Should a civil servant QAM not be available at the time of the close call or mishap, the ASO or the ASO's designated representative is responsible for performing these duties.

## 2.4 Mission Mishap and Security Plans

2.4.1 All deployed missions involving GSFC aircraft requires a Mishap Anomaly and Contingency Plan be produced by the mission project manager. This plan shall include all elements of the 830-MAMC-0001 with the addition of mission specific aircraft hazardous materials safety data sheets (SDS) and deployment location specific notification/contact information. The ASO shall review and sign off on all mission Mishap Anomaly and Contingency Plans which will then be routed to the NASA Office of Safety and Mission Assurance (OSMA) for acceptance.

2.4.2 All deployed missions involving GSFC aircraft requires an Aircraft Security Plan (830-SEC-0001). This plan shall account for the requirements associated with airfield facilities and capabilities necessary for deployment of GSFC aircraft. If these requirements are not met, this plan will present mitigation strategies that should be put in place to ensure security meets NASA standards. These security plans are reviewed by the ASO.

2.4.3 For those instances where there are required transit stops to or from the deployment airfield with a planned stay of less than 72 hours in any one location, neither a Mishap Anomaly and Contingency Plan nor an Aircraft Security Plan is required. The 830-MAMC-0001 shall provide the mishap response framework for all transit operations.

## 2.5 Risk Management, Risk Assessment, and Hazard Analysis

Formal hazard analysis and mitigation strategies are the cornerstone to any aviation safety program. For all flight missions being managed or overseen by the GSFC Aircraft Office, the Airworthiness Flight Safety Review Board (AFSRB) is utilized. The AFSRB is the overarching hazard identification and mitigation system used by the GSFC Aircraft Office to ensure that the highly variable and diverse flight mission sets receive appropriate levels of risk assessment processes. This is a dynamic system and is defined in detail in GPR 7900.1). Additionally, the GSFC Aircraft Office utilizes the GPR 7120.4, *Risk*

*Management* as the model document for consistent hazard analysis. All aviation related hazards are to utilize the 5x5 risk matrix as defined in GPR 7120.4.

2.5.1 Mission Operations Risk Assessment Panel/Process (MORAP) - The primary operational mission risk assessment process supporting the AFSRB is the Mission Operations Risk Assessment Panel/Process (MORAP). Each individual mission's risk shall be evaluated by a MORAP consisting of, at a minimum, the Aircraft Lead (for the type aircraft assigned to the mission), the assigned Project Pilot, and the ASO.

The ASO, or a designated alternate, shall chair the MORAP discussions.

The AFSRB shall determine if a full MORAP needs to be performed based upon the planned complexity and/or anticipated risk associated with a given mission. The expectation from the AFSRB process is that all hazards for a mission be captured through several risk assessment processes including the MORAP which is designed to capture operational and training hazards. At a minimum for any mission under the purview of the GSFC Aircraft Office, the ASO shall review the medical clearances, annual aircraft proficiency documentation, currency and training of all aircrew assigned to the mission for compliance with NPR 7900.3 and 830-FOM-0001, *GSFC Flight Operations Manual*, requirements. If a full MORAP is deemed necessary by the AFSRB, then all items annotated in 2.5.1.1 shall be addressed.

2.5.1.1 Determination of Mission Risk Categories - Programmed early in each mission lifecycle, the MORAP shall conduct a technical interchange meeting with assigned project personnel (project managers, project support managers, experimental team members, scientists etc.) as desired/required by the MORAP to determine preliminary Mission Risk Category. The review will, at a minimum, include:

a. Mission requirements
b. Crew makeup, mission manning, pilot experience requirements
c. Crew duty day and crew rest
d. Mission profiles and energy states
e. Mission fuel requirements
f. Aircraft maneuvers and lateral positional accuracy requirements
g. Required flight operations conditions and procedures
h. Required aircraft equipment (mission specific minimum equipment list (MEL)
i. Pilot or aircrew mission specific training
j. Operational Go/No-Go criteria
k. Aircraft modifications, configuration and limitations
l. Required special weather conditions
m. The region: terrain, climate, survivability
n. Specialized survival equipment requirements
o. Specialized crew survival training requirements
p. Lighting conditions, pilot visual cues or distractions, pilot familiarity with the area
q. Provide input to test plan development

r. The development of a dedicated and detailed mission Concept of Operations (CONOPS) (when required)
s. Other topics, as required.

2.5.1.2 MORAP Output - After analyzing the mission's detailed conditions, constraints and requirements, the MORAP will make recommendations, in writing by memorandum, to the Chairman of the AFSRB.

2.5.1.3 MORAP Mission Risk Categories - One of the following Mission Risk Categories shall be assigned to all GSFC Aircraft Missions:

a. Mission Risk Category I (Minimum) - A minimum risk mission is characterized by generally favorable operational conditions. The aircraft is flown in a normal configuration (speed, loading, altitude, geographic area, environmental conditions, pilot work load etc.), using standard flight rules under (Visual Flight Rules (VFR) or Instrument Flight Rules (IFR)). Such missions involve primarily point-to-point flying using landing areas that are fully adequate for the respective aircraft performance and avionics instrumentation. Extraneous pilot tasks are minimized such that the pilot may devote essentially full attention to flying the aircraft. Minor additional tasks may be assigned such as the testing of communications gear, scientific instrumentation, navigation equipment, or transporting passengers and cargo.

b. Mission Risk Category II (Elevated) - Elevated risk missions regularly involve exposure to situations requiring a significantly higher level of pilot experience, skills, or attention. Missions in this category may include: maneuvering flights in high traffic areas, extended range over water flights, operations over extreme temperature regions, operations in mountainous terrain, extended low level segments, limited visibility or night operations, use of unimproved airfields or runways lengths that restrict aircraft performance for standard operations, close formation or high-speed intercept flying.

c. Mission Risk Category III (Substantial) - Substantial risk missions involve tasks and conditions that require materially greater pilot experience, skills, or attention. Certain situations may themselves expose the aircraft and crew to substantial risk, or a combination of multiple elevated risk elements may place the mission into this risk category. Such missions typically require the pilot to sustain high gain tasks (such as precise lateral and vertical navigation profiles, extended operations in unstable portions of the aircraft envelope etc.) combined with exacerbating external factors (such as maneuvering close to vertical terrain, limited visibility, unstable air currents, or extreme weather conditions etc.) which combine to present rapid pilot fatigue.

d. Inherently Hazardous Operations - Situations that are substantially hazardous in themselves include: using night vision goggles in high- or low-speed flight at very low altitudes, operation of the aircraft in a manner outside procedures recommended by the flight manual (e.g., piloting airplanes at very low speeds and altitudes or flying rotary wing aircraft outside the recommended height/velocity profile), or performing operations that require waiver of safety standards and regulations. All complex flight

missions (excluding contracted aircraft operations) conducted under the purview of the GSFC Aircraft Office will convene a MORAP, chaired by the ASO, to assess operational hazards and establish mitigation strategies in accordance with Section 2.4.1.1 of this GPR. For recurring missions with minimal operational hazard changes, the ASO shall review the previously documented MORAP findings for completeness. If no changes to scope and hazard are noted, the previous MORAP memo will be accepted with an annotation by the ASO (signature with new date).

Ideally, the MORAP shall be convened as early as possible in the life cycle of a mission to set expectations and appropriate limitations for those involved in the operation. Additionally, a MORAP may be convened at the discretion of the ASO or the Chief of the Aircraft Office should a hazard analysis process be deemed necessary for any flight activity associated with the GSFC Aircraft Office.

## 2.6 Project and Program Safety Plans

In accordance with NPR 7900.3, the ASO shall ensure that project and program safety plans are subject to a review process. The review ensures that the plans address associated risks and hazards with the specific project or program.

Once approved, the ASO shall ensure that the plans are disseminated to all involved personnel. The requirements for these safety plans may be satisfied by flight test plans or safety permits but still are subject to the review process.

## 2.7 Flight/Mission Readiness Reviews

All GSFC programs and projects using aviation assets require review and approval by a management appointed flight/mission readiness review panel prior to flight. Flight Readiness Reviews (FRR) and Mission Readiness Reviews (MRR) shall be conducted in accordance with the NPR 7900.3. The ASO (or delegated representative), is a required participant and voting member of any manned or unmanned aircraft GSFC Readiness Reviews.

## 2.8 Fatigue Management Plans

The AFSRB in accordance with GPR 7900.1 and NPR 7900.3 shall determine if the Fatigue Management Plan (FMP) is required for a given mission.

All mission specific FMPs shall be in compliance with the NPR 1800.1. The ASO shall review this plan prior to mission deployment.

## Appendix A – Definitions

**A.1** **Hazard Analysis.** The technique used to systematically identify, evaluate, resolve, and assess hazards.

**A.2** **NASA Aircraft.** Aircraft that are bought, borrowed, chartered, rented, or otherwise procured or acquired--including aircraft produced with the aid of NASA funding--regardless of cost, from any source for the purpose of conducting NASA science, research, or other missions, and which are operated by NASA or whose operation is managed by NASA. Unmanned aircraft are defined as "aircraft" by the FAA and are included in the definition of NASA aircraft, unless specified otherwise.

**A.3** **NASA Inter-Center Aircraft Operations Panel.** The IAOP is composed of the Chiefs of Flight Operations from NASA Centers that operate aircraft, representatives from HQ Aircraft Division, advisors from appropriate NASA Centers, and the OSMA.

**A.4** **Unmanned Aerial System (UAS).** A UAS is any airborne vehicle system without a pilot onboard that is controlled autonomously by an onboard control and guidance system or is controlled from a monitoring station outside of or remote from the UAS vehicle. A UAS is defined as an aircraft by the FAA. UASs also can be operated via a remotely located, manually operated, flight control system or ground control system.

## Appendix B – Acronyms

| | |
|---|---|
| AD | Aircraft Division |
| AFSRB | Airworthiness and Flight Safety Review Board |
| AIR | Airfield Irregularity Report |
| ALSE | Aviation Life Support Equipment |
| AOOM | Aircraft Office Operations Manager |
| ASO | Aviation Safety Officer |
| CAS | Commercial Aircraft Services |
| CONOPS | Concept of Operations |
| ERP | Engineering Review Panel |
| FMP | Fatigue Management Plan |
| FOD | Foreign Objects & Debris |
| FRR | Flight Readiness Review |
| GMIP | Government Mandatory Inspection Points |
| GSFC | Goddard Space Flight Center |
| GSO | Ground Safety Officer |
| IAOP | Intercenter Aircraft Operations Panel |
| IFR | Instrument Flight Rules |
| IRT | Incident Response Team |
| MEL | Minimum Equipment List |
| MIB | Mishap Investigation Board |
| MORAP | Mission Operations Risk Assessment Panel |
| MRR | Mission Readiness Review |
| NMIS | NASA Mishap Information System |
| OSD | Operations Safety Directive |
| OSMA | Office of Safety and Mission Assurance |
| PIC | Pilot-in-Command |
| PIR | Pilot Irregularity Report |
| QA | Quality Assurance |
| QAM | Quality Assurance Manager |
| SDS | Safety Data Sheets |
| SMC | Safety Management Committee |
| SOW | Statement of Work |
| SSOPD | Suborbital and Special Orbital Projects Directorate |
| TM | Training Manager |
| UAS | Unmanned Aerial Systems |
| VFR | Visual Flight Rules |
| WFF | Wallops Flight Facility |

## CHANGE HISTORY LOG

| Revision | Effective Date | Description of Changes |
|---|---|---|
| Baseline | April 5, 2016 | Initial Release. This GPR replaces GPR 8715.2, Aviation Safety Program. Numbering changed to align with Agency Aircraft Operations Documents |
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